REMARKS

By this response, claims 1-3 have been amended, and new claims 4-12 have been added, leaving claims 1-12 pending in the application. Support for the amendments to claim 1 (and for new claims 5 and 9) is provided, for example, at page 3, last paragraph; and page 7, line 1 – page 8, line 25, of the present specification. Support for claim 4 is provided in the original claims. The specification has been amended to address minor informalities. Applicants submit that no new matter has been added to the application by the amendments.

Reconsideration and allowance of the application are respectfully requested in light of the following remarks.

Obviousness-Type Double Patenting Rejection

Claims 1-3 stand rejected under the doctrine of obviousness-type double patenting over claims 1-5 of co-pending U.S. Patent Application No. 10/726,542, for the reasons stated at page 2 of the Official Action.

Applicants will reconsider the propriety of submitting a Terminal Disclaimer with respect to the '542 application once allowable subject matter is indicated in this application.

Rejection Under 35 U.S.C. § 102

Claims 1 and 3 stand rejected under 35 U.S.C. § 102(a) over G. Antonelli, "Non-Destructive Condition Assessment of Serviced MCrAlY Coatings" ("Antonelli") or G. Antonelli et al., "Qualification of a Frequency Scanning Eddy Current Equipment for Nondestructive Characterization of new and Serviced High-

Temperature Coatings" ("Antonelli et al."). The reasons for the rejection are stated on pages 2-3 of the Office Action. The rejection is respectfully traversed.

Claim 1, as amended, recites "a method of determining the service metal temperature of a γ/γ′ MCrAlY-coated component applied to a component after use of the component in a high temperature environment, where the γ/γ′-MCrAlY-coating exhibits a non-equilibrium γ/γ′-microstructure at a temperature lower than the temperature during operation and the depletion of chromium from the γ/γ′-MCrAlY-coating still allows the α-Cr phase to form, the method comprising: (a) measuring qualitatively impedance curves or measuring the coating electrical conductivity and magnetic permeability of the non-equilibrium MCrAlY-coating of the component in the post-service condition at different locations of the component by means of a multi-frequency eddy current system, (b) then subjecting the coated component to a heat treatment to transform the MCrAlY coating into an equilibrium microstructure of the coating; (c) then measuring qualitatively impedance curves or measuring the coating electrical conductivity and magnetic permeability of the equilibrium MCrAlY-coating at different locations of the component by means of a multi-frequency eddy current system; and (d)"determining the exposure temperature of the different locations of the component based on the difference in the measured qualitatively impedance curves or the measured conductivities and permeabilities, before and after the heat treatment according to (b)" (emphasis added).

As explained at page 3, lines 16-27 of the present specification, during an engine stop from the operating temperature down to below 600°C, a γ/γ' MCrAlY-coating exhibits a non-equilibrium γ/γ'-microstructure at room temperature due to the rapid cooling. Equilibrium phases stable at low temperatures, such as the α-

chromium phase, cannot re-precipitate during such rapid cooling. The resulting non-equilibrium microstructure of the coating results in a modified coating conductivity. Consequently, a NDT coating assessment using the multi-frequency eddy current method is unreliable.

In light of this problem regarding unreliable NDT coating assessment, Applicants determined that by subjecting a component including an applied γ/γ' MCrAlY-coating to the heat treatment recited at (b) in claim 1 (to produce an equilibrium microstructure of the coating) after using the component in a high temperature environment, where the γ/γ' MCrAlY-coating exhibits a non-equilibrium γ/γ' microstructure at a temperature lower than the temperature during operation, a non-destructive testing method can be used to determine Al and/or Cr depletion within the γ/γ' MCrAlY-coating.

Applicants respectfully submit that the applied art fails to disclose the method recited in claim 1. In contrast to the claimed method, Antonelli and Antonelli et al. both disclose a method of measuring the electrical conductivity and magnetic permeability of a **γ/β** MCrAlY coating using a multi-frequency eddy current system. For example, see Antonelli at page 7, fourth paragraph. In contrast, the claimed method can determine the depletion of Al and Cr of a **γ/γ'** MCrAlY-coating. See the description at page 2, line 4 - page 3, line 16, and at page 5, line 28 - page 6, line 33, of the present specification.

Not only do Antonelli and Antonelli et al. both fail to disclose a method of measuring the electrical conductivity and magnetic permeability of a **γ/γ'** MCrAlY coating, as admitted in the Office Action, both references also fail to disclose the features of "subjecting the coated component to a heat treatment to transform the

MCrAlY coating into an equilibrium microstructure of the coating," as recited in claim 1.

Applicants submit that the method disclosed in Antonelli and Antonelli et al. is only applicable to measuring **γ/β** MCrAlY coatings due to the structural characteristics of such coatings. Such γ/β MCrAlY coatings do not present the same measurement difficulties as γ/γ' coatings. See page 1, line 34 – page 3, line 27, of the present specification. As explained at page 3, lines 3-14, of the present specification, the applicability of NDT eddy current methods for estimating the expended life of service-exposed γ/β MCrAlY coatings is straightforward as compared to using such techniques for γ/γ' coatings. As explained at page 5, line 26 - page 6, line 25, of the present specification, a MCrAlY alloy with a γ/β structure is stable on a wide temperature range. In contrast, the microstructure of a non-depleted SV20 coating is strongly dependent on the temperature the component is subjected to during operation. Antonelli and Antonelli et al. both fail to disclose heat treating a component coated with a γ/β MCrAlY coating, in a post-service condition after use in a high-temperature environment, to transform a non-equilibrium high temperature microstructure into the equilibrium room temperature microstructure before measuring the coating using a multi-frequency eddy current system.

For the foregoing reasons, claims 1 and 3 are not anticipated by Antonelli or Antonelli et al. Therefore, withdrawal of the rejection is respectfully requested.

Rejection Under 35 U.S.C. § 103

Claims 1-3 stand rejected under 35 U.S.C. § 103(a) over Antonelli or Antonelli et al. in view of U.S. Patent No. 4,973,445 to Singheiser. The reasons for the

rejection are stated on pages 3-4 of the Office Action. The rejection is respectfully traversed.

The Office Action admits that Antonelli and Antonelli et al. both fail to disclose "the specifically recited MCrAlY alloy." The Office Action references page 5 of the present specification. However, the Office Action contends that Singheiser cures the deficiencies of Antonelli and Antonelli et al. Applicants respectfully disagree.

Singheiser discloses a high-temperature protective coating. At the least, Singheiser does not suggest modifying Antonelli or Antonelli et al. to result in the method recited in claim 1, including, *inter alia*, "subjecting the coated component to a heat treatment to transform the MCrAlY coating into an equilibrium microstructure of the coating." Accordingly, the applied references do not support the alleged obviousness, and the method recited in claim 1 is patentable. Dependent claims 2 and 3 are also patentable for at least the same reasons as those for which claim 1 is patentable.

Therefore, withdrawal of the rejection is respectfully requested.

New Claims

New dependent claims 4-12 depend ultimately from claim 1 and thus are also patentable.

Conclusion

For the foregoing reasons, allowance of the application is respectfully requested. Should there be any questions concerning this response, or the application in general, Applicants' undersigned representative can be reached at the telephone number given below.

Respectfully submitted,

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Date: August 16, 2005

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